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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/620,459	07/17/2003	Nobuo Suzuki	0649-0902P	9186

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BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

EXAMINER	
YODER III, CHRISS S	
ART UNIT	PAPER NUMBER
2622	

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
3 MONTHS	01/16/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 01/16/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No.	Applicant(s)	
	10/620,459	SUZUKI ET AL.	
	Examiner	Art Unit	
	Chriss S. Yoder, III	2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 July 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 September 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

The drawings were received on September 30, 2003. These drawings are not acceptable.

Figure 3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koike et al. (US Patent # 4,514,766) in view of Yamada (US Patent # 6,236,434) and further in view of Harada (US Patent # 6,211,915).

2. In regard to claim 1, note Koike discloses the use of a solid-state image pick-up device having a plurality of photoelectric converting devices arranged in a row direction and a column direction orthogonal thereto over a surface of a semiconductor substrate (figure 2: 1), comprising a vertical transfer section for transferring a charge from the photoelectric converting device in the column direction (figure 2: 2), a horizontal transfer section for transferring a charge from the vertical transfer section in the row direction (figure 2: 3'), and an output section for outputting a signal corresponding to a charge transferred through the horizontal transfer section (figure 1: 4), the vertical transfer section includes a plurality of vertical transfer channels formed on the semiconductor substrate corresponding to the photoelectric converting devices provided in the column direction, a plurality of vertical transfer electrodes formed to cross each of the vertical transfer channels as seen on a plane, and a charge reading region for reading a charge of the photoelectric converting device onto the vertical transfer channels (figure 2: the transfer channel is considered to be path 2, the transfer electrodes are only partially illustrated by 5-1 and 5-2, and the charge reading region is considered to be the arrow output from each pixel), the charge reading regions of the photoelectric converting devices which are adjacent to each other in the column direction are formed between the vertical transfer channels which are different from each other (figure 2: adjacent pixels in the same column are output to separate vertical transfer channels in opposite directions).

Therefore, it can be seen that the Koike device lacks the use of a plurality of high-sensitivity photoelectric converting devices arranged like a tetragonal grid in the

row direction and the column direction orthogonal thereto and serving to carry out a photoelectric conversion having a relatively high sensitivity, and a plurality of low-sensitivity photoelectric converting devices arranged like the tetragonal grid in the row direction and the column direction orthogonal thereto and serving to carry out a photoelectric conversion having a relatively low sensitivity, wherein the high and low sensitivity photoelectric converting device are arranged at an equal array pitch in positions shifted by 1/2 of the array pitch from each other in both the row and column direction, vertical transfer channels that take a winding shape extended wholly in the column direction between the photoelectric converting devices, and vertical transfer electrodes that take a winding shape extended wholly in the row direction between the photoelectric converting devices.

Yamada discloses the use of a solid-state image pick-up device wherein the photoelectric converting device are arranged at an equal array pitch in positions shifted by 1/2 of the array pitch from each other in both the row and column direction (figure 1), vertical transfer channels that take a winding shape extended wholly in the column direction between the photoelectric converting devices (column 3, line 63- column 4, line 16 and figure 1: 16-17), and vertical transfer electrodes that take a winding shape extended wholly in the row direction between the photoelectric converting devices (column 6, lines 14-40 and figure 8: 39-42). Yamada teaches that the use of a solid-state image pick-up device wherein the photoelectric converting device are arranged at an equal array pitch in positions shifted by 1/2 of the array pitch from each other in both the row and column direction, vertical transfer channels that take a winding shape

extended wholly in the column direction between the photoelectric converting devices, and vertical transfer electrodes that take a winding shape extended wholly in the row direction between the photoelectric converting devices is preferred in order to reduce distance between adjacent columns and thereby increase the sensor resolution (column 4, lines 50-64). Therefore, it would have been obvious to one of ordinary skill in the art to modify the Koike device to include the use of a solid-state image pick-up device wherein the photoelectric converting device are arranged at an equal array pitch in positions shifted by 1/2 of the array pitch from each other in both the row and column direction, vertical transfer channels that take a winding shape extended wholly in the column direction between the photoelectric converting devices, and vertical transfer electrodes that take a winding shape extended wholly in the row direction between the photoelectric converting devices is preferred in order to reduce distance between adjacent columns and thereby increase the sensor resolution, as suggested by Yamada.

Harada discloses the use of a plurality of high-sensitivity photoelectric converting and a plurality of low-sensitivity photoelectric converting devices serving to carry out a photoelectric conversion having a relatively high and low sensitivity (column 1, lines 20-30). Harada teaches that the use of a plurality of high-sensitivity photoelectric converting and a plurality of low-sensitivity photoelectric converting devices serving to carry out a photoelectric conversion having a relatively high and low sensitivity is preferred in order to widen the dynamic range of the imaging device (column 1, lines 20-30). Therefore, it would have been obvious to one of ordinary skill in the art to modify

the Koike device to include the use of a plurality of high-sensitivity photoelectric converting and a plurality of low-sensitivity photoelectric converting devices serving to carry out a photoelectric conversion having a relatively high and low sensitivity is preferred in order to widen the dynamic range of the imaging device, as suggested by Harada.

3. In regard to claim 2, note the primary device of Koike in view of Yamada and Harada discloses the use of a solid-state image pick-up device having a plurality of photoelectric converting devices, as claimed in claim 1 above.

Therefore, it can be seen that the primary device lacks the use of four vertical transfer electrodes are corresponding to one photoelectric converting device and are driven by vertical transfer pulses having eight phases together with the four vertical transfer electrodes corresponding to other photoelectric converting devices which are adjacent to each other in the column direction. Official Notice is taken that the concepts and advantages of using four vertical transfer electrodes provided corresponding to one photoelectric converting device and are driven by vertical transfer pulses having eight phases together with the four vertical transfer electrodes corresponding to other photoelectric converting devices which are adjacent to each other in the column direction are notoriously well known and expected in the art. Therefore, it would have been obvious to one of ordinary skill in the art to modify the primary device to include the use of four vertical transfer electrodes provided for each pixel in that are driven by

vertical transfer pulses having eight phases in order to increase the transfer speed and capacity of the imaging device.

4. In regard to claim 3, note the primary device of Koike in view of Yamada and Harada discloses the use of a solid-state image pick-up device having a plurality of photoelectric converting devices, as claimed in claim 1 above.

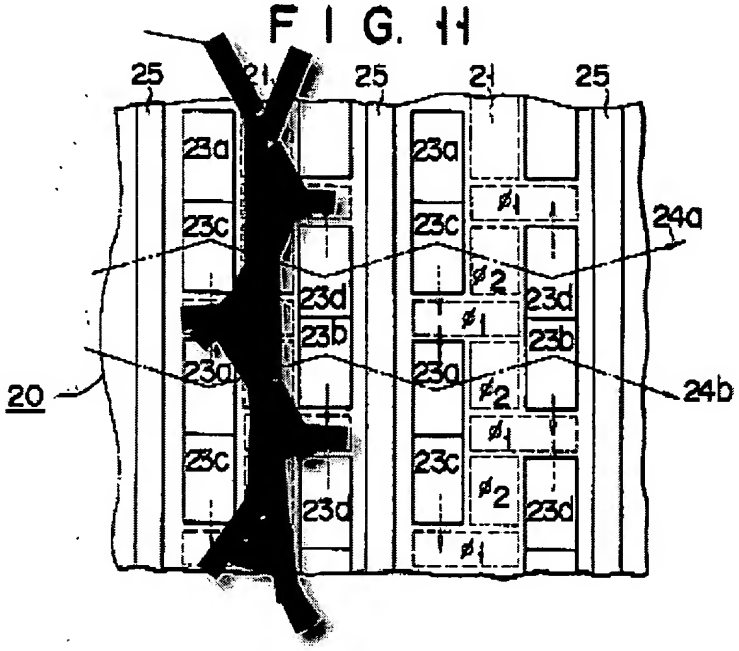
Therefore, it can be seen that the primary device lacks the use of two vertical transfer electrodes are corresponding to one photoelectric converting device and are driven by vertical transfer pulses having four phases together with the two vertical transfer electrodes corresponding to other photoelectric converting devices which are adjacent to each other in the column direction. Official Notice is taken that the concepts and advantages of using two vertical transfer electrodes provided corresponding to one photoelectric converting device and are driven by vertical transfer pulses having four phases together with the two vertical transfer electrodes corresponding to other photoelectric converting devices which are adjacent to each other in the column direction are notoriously well known and expected in the art. Therefore, it would have been obvious to one of ordinary skill in the art to modify the primary device to include the use of two vertical transfer electrodes provided for each pixel in that are driven by vertical transfer pulses having four phases in order to increase the transfer speed and capacity of the imaging device.

5. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sekine et al. (US Patent # 4,336,556) in view of Yamada (US Patent # 6,236,434) and further in view of Harada (US Patent # 6,211,915).

6. In regard to claim 4, note Sekine discloses the use of a solid-state image pick-up device having a plurality of photoelectric converting devices arranged in a row direction and a column direction orthogonal thereto over a surface of a semiconductor substrate (figure 11: 23), comprising a vertical transfer section for transferring a charge from the photoelectric converting device in the column direction (figure 11: 21), a horizontal transfer section for transferring a charge from the vertical transfer section in the row direction (figure 4: 26), and an output section for outputting a signal corresponding to a charge transferred through the horizontal transfer section (figure 4: 6), the vertical transfer section includes a plurality of vertical transfer channels formed on the semiconductor substrate corresponding to the photoelectric converting devices provided in the column direction, a plurality of vertical transfer electrodes formed to cross each of the vertical transfer channels as seen on a plane, and a charge reading region for reading a charge of the photoelectric converting device onto the vertical transfer channels (figure 11: the transfer channel is considered to be path 21, the transfer electrodes are only partially illustrated by Φ1 and Φ2, and the charge reading region is considered to be the arrow output from each pixel), the vertical transfer channel takes such a shape as to connect two winding shapes extended wholly in the column direction between the photoelectric converting devices (figure 11: 21 is considered to extend in both the left and right directions in a winding pattern connected at electrode Φ1; an

example can be seen below), and that the respective vertical transfer channels are shared for the transfer of the charges from two adjacent columns (figure 11: 21, Φ1 and Φ2).

FIG. 11



Therefore, it can be seen that the Sekine device lacks the use of a plurality of high-sensitivity photoelectric converting devices arranged like a tetragonal grid in the row direction and the column direction orthogonal thereto and serving to carry out a photoelectric conversion having a relatively high sensitivity, and a plurality of low-sensitivity photoelectric converting devices arranged like the tetragonal grid in the row direction and the column direction orthogonal thereto and serving to carry out a photoelectric conversion having a relatively low sensitivity, wherein the high and low sensitivity photoelectric converting device are arranged at an equal array pitch in positions shifted by 1/2 of the array pitch from each other in both the row and column

direction, vertical transfer electrodes that take a winding shape extended wholly in the row direction between the photoelectric converting devices, and that the pixels from adjacent columns that share a respective vertical transfer channel are of high and low sensitivity.

Yamada discloses the use of a solid-state image pick-up device wherein the photoelectric converting device are arranged at an equal array pitch in positions shifted by 1/2 of the array pitch from each other in both the row and column direction (figure 1) and vertical transfer electrodes that take a winding shape extended wholly in the row direction between the photoelectric converting devices (column 6, lines 14-40 and figure 8: 39-42). Yamada teaches that the use of a solid-state image pick-up device wherein the photoelectric converting device are arranged at an equal array pitch in positions shifted by 1/2 of the array pitch from each other in both the row and column direction and vertical transfer electrodes that take a winding shape extended wholly in the row direction between the photoelectric converting devices is preferred in order to reduce distance between adjacent columns and thereby increase the sensor resolution (column 4, lines 50-64). Therefore, it would have been obvious to one of ordinary skill in the art to modify the Koike device to include the use of a solid-state image pick-up device wherein the photoelectric converting device are arranged at an equal array pitch in positions shifted by 1/2 of the array pitch from each other in both the row and column direction and vertical transfer electrodes that take a winding shape extended wholly in the row direction between the photoelectric converting devices is preferred in order to

reduce distance between adjacent columns and thereby increase the sensor resolution, as suggested by Yamada.

Harada discloses the use of a plurality of high-sensitivity photoelectric converting and a plurality of low-sensitivity photoelectric converting devices serving to carry out a photoelectric conversion having a relatively high and low sensitivity pixels in different columns (column 1, lines 20-30 and figure 4). Harada teaches that the use of a plurality of high-sensitivity photoelectric converting and a plurality of low-sensitivity photoelectric converting devices serving to carry out a photoelectric conversion having a relatively high and low sensitivity in different columns is preferred in order to widen the dynamic range of the imaging device (column 1, lines 20-30). Therefore, it would have been obvious to one of ordinary skill in the art to modify the Koike device to include the use of a plurality of high-sensitivity photoelectric converting and a plurality of low-sensitivity photoelectric converting devices serving to carry out a photoelectric conversion having a relatively high and low sensitivity in different columns is preferred in order to widen the dynamic range of the imaging device, as suggested by Harada.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US005283451A: note the use of an imaging device having different phases for image transfer.

US006760071B1: note the use of an imaging device having different phases for image transfer.

US006583818B1: note the use of an imaging device having different phases for image transfer.

US006690421B1: note the use of an image sensor having pixels of the same column that are output to different transfer channels.

US005306906A: note the use of winding transfer channels.

US004242700: note the use of combined transfer channels.

US005051832: note the use of an imaging device having different phases for image transfer.

US004602289: note the use of pixels that are output in different directions.

US005274476A : note the use of an image sensor having pixels of the same column that are output to different transfer channels.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chriss S. Yoder, III whose telephone number is (571) 272-7323. The examiner can normally be reached on M-F: 8 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivek Srivastava can be reached on (571) 272-7304. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CSY
January 4, 2007

VIVEK SRIVASTAVA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600